

POSTER PRESENTATION

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Feasibility of detecting myocardial ischemia using first-pass contrast MRI and regadenoson

Matthew Lyons¹, Cylen Javidan-Nejad², Ibrahim M Saeed³, Donna Lesniak², Gary R McNeal⁴, Agus Priatna⁴, Robert J Gropler², Pamela K Woodard^{2*}

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Summary

A single injection of regadenoson can be used instead of an adenosine infusion to produce coronary vasodilatation and demonstrate myocardial ischemia during first-pass perfusion cardiac MRI.

Background

Cardiac stress MR perfusion imaging requires an MRI compatible infusion pump for the administration of adenosine or a non-MRI compatible pump housed in the control room or beyond the 10-Gauss line. Regadenoson is a recently FDA-approved A_{2A} receptor agonist that can be given intravenously in a single bolus. It has been shown to provide diagnostic information regarding myocardial ischemia on SPECT-MPI.

Methods

42 patients (34 M, 55 yrs, range 41-73 yrs) with a reversible myocardial perfusion defect on SPECT-MPI underwent a cardiac perfusion MRI within 7 days of the SPECT-MPI. MR exams consisted of short and long axis cine steady state free precession (SSFP) imaging, matched gradient-recalled echo (GRE) GRAPPA temporal parallel acquisition (TPAT) first-pass stress perfusion (TR 2.3 msec, TE 1.1 msec, 80*256 matrix, 1.4 x 3.1mm²), and delayed contrast-enhanced (DCE) T1 GRE imaging. First-pass perfusion images were obtained 30 seconds after regadenoson 400 micrograms administered in a single IV bolus and during power injection of 0.075 mmol/Kg of gadobenate dimeglumine at 5 mL/sec IV followed by normal saline flush. DCE imaging was obtained 10 minutes after injection of an additional 0.025 mmol/Kg of contrast agent.

Results

All but one patient tolerated the regadenoson MR examination. One patient had chest pain shortly after imaging, and received aminophylline, with resolution of symptoms. MR showed ischemia in 33/42 subjects. In 8 subjects the MR perfusion exam was normal. Five of these 8 patients underwent clinically-ordered invasive cardiac catheterization (ICA) within 3-18 days of the MRI examination. ICA showed no stenoses, suggesting SPECT attenuation artifact. The other 3/8 patients had no MACE within 30-180 days. In one patient, SPECT demonstrated ischemia only, while MRI showed infarct only in the same segment.

Conclusions

Regadenoson can be used in cardiac MR perfusion imaging to demonstrate ischemia. MRI perfusion imaging may be useful in differentiating attenuation artifact from true disease.

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Author details

¹Metrohealth Medical Center, Cleveland, OH, USA. ²Washington University School of Medicine, St. Louis, MO, USA. ³St. Luke's Cardiovascular Consultants, Kansas City, MO, USA. ⁴Siemens Medical Systems, Malvern, PA, USA.

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²Washington University School of Medicine, St. Louis, MO, USA
Full list of author information is available at the end of the article